METHOD OF INSTALLING A TERMINAL, AND A WIRELESS TELEPHONE SYSTEM

FIELD OF THE INVENTION

The invention relates to a method of installing a terminal in a telephone system comprising a number of terminals, and a management system which controls and monitors the operation of the terminals having device-specific operational parameters set by the management system.

BACKGROUND OF THE INVENTION

As cellular radio systems become increasingly common and their coverage areas grow more extensive and as they often replace systems implemented by fixed line telephone connections, it has become necessary to develop telephone systems which utilize cellular radio systems. Such telephones are needed for example in regions where no fixed line telephone connections exist, or in applications in which a terminal is placed in an environment where no connection with a fixed network is easily available, such as moving vehicles. The present invention can be applied particularly to systems implemented by cellular radio systems.

Such systems and terminals are, for example, pay phones, so-called wireless local loop (WLL) terminals, payment terminals in stores and mobile smart card terminals by which money is transferred between a bank and a smart card.

Let us first examine pay phone systems. An important characteristic of a pay phone for the pay phone operator is the control and monitoring of the pay phone. Consequently, pay phone systems comprise a management system. The pay phones convey control and monitoring information to the management system. This information comprises traffic and failure reports, notifications of maintenance need, in coin box telephones the number of coins, in card phones the information on cards used, the manner of communication with the management system, etc. The management system, in turn, controls the operation of the pay phones by setting the parameters of the pay phones. Such phone-specific parameters include the phone number, the tariff information on the calls, the phone card types accepted, the language options of the phone and the voice volume.

Some operational parameters can be given default values already at the factory when the devices are being manufactured and delivered to the operator. Most operational parameters are, however, dependent on the loca-

tion of the telephone. In the tariff information, for example, a local call has different initial numbers at different locations. Hence, all operational parameters cannot be set in the devices at the factory, since no information exists on the future location of the devices. This applies also to so-called SIM cards which are used in GSM-based phones. Not until when the devices are put to use in the target country are the SIM cards installed in the pay phones by the operator.

Hence, most operational parameters have thus far been fed to the pay phone to be installed in connection with the installation. The task has been performed manually via the telephone user interface. Alternatively, memory circuits having different contents have been manufactured, and in connection with the installation a memory circuit comprising the correct information has been installed in the telephone. Furthermore, the specific phone number of the device has been fed to it. These procedures usually take about 20 minutes. Feeding the information to the device on the installation site is slow and errors are easily made. Moreover, in accordance with a further method the installer has made a call on the device to the management system of the operator in which the management system manager has loaded the device-specific information into the telephone. This alternative has enabled telephone installations to be carried out only when the management system site has been manned, and the procedure is still time-consuming.

The known methods are thus extremely problematic; the operators appreciate rapid and easy installation of pay phones.

Similar procedures and problems apply also to other telephone systems in which the terminals communicate with the management system of the telephone system. The payment terminals in stores, for example, may communicate with the management system in a similar manner and require similar operational parameters as the pay phones.

BRIEF DESCRIPTION OF THE INVENTION

The invention thus relates to a method and a system by which the prior art problems above can be solved. This is achieved by a method described in the introduction, which is characterized in that when a new terminal is put to use in the system for the first time, the terminal sends the management system a message indicating the terminal in question, and that the man-

agement system starts controlling the terminal on the basis of the message and sends the necessary operational parameters to the terminal.

The invention further relates to a telephone system comprising a number of terminals and a management system which controls and monitors the operation of the terminals which are arranged to store and use the device-specific operational parameters set by the management system. The telephone system of the invention is characterized in that the terminal of the system comprises means for detecting when the terminal is put to use in the system for the first time, and means for sending a message indicating the terminal in question to the management system which is arranged to start controlling the terminal on the basis of the message and send the necessary operational parameters to the terminal.

The preferred embodiments of the invention are disclosed in the dependent claims.

Several advantages can be achieved by the method and system of the invention. At the factory, all devices to be delivered to the customers can be delivered with the same settings and software, which significantly simplifies the logistics. It is relevant for the operator that the installation becomes easier and swifter. The automation of installation reduces potential errors. Installations can be carried out irrespective of whether the management system is manned or not.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in closer detail in connection with the preferred embodiments with reference to the accompanying drawings, in which

Figure 1 is a diagram illustrating a structure of a telephone system,

Figure 2 is a diagram illustrating another structure of a telephone system,

Figure 3 is a block diagram showing an example of the structure of the pay phone terminal of the system in accordance with the invention.

DETAILED DESCRIPTION OF THE INVENTION

In the following, the invention will be described in closer detail using a pay phone system which is implemented by the digital GSM mobile phone system as an example without restricting to it, however. It will be obvious that the solution of the invention can be implemented with slight modifications in

any telephone system implemented by other techniques, in which the terminals have device-specific operational parameters set by the management system.

Figure 1 illustrates a structure of a pay phone system implemented in a cellular radio system. The system comprises a number of pay phones 100 to 102, each connected to base stations 108 to 110 via radio paths 104 to 106. For the radio path and the base station, the terminals operating as pay phones do not differ from regular subscriber terminals in any way. The base stations 108 to 110 typically communicate with base station controllers 116 to 118, each controlling several base stations, via transmission lines 112 to 114 which can be implemented by means of an optical cable, a copper cable or a link connection. The base station controllers 116 to 118, in turn, communicate with a mobile switching centre 124 via transmission lines 120 to 122, said mobile switching centre controlling the operation of the base station controllers and forwarding the calls of the terminals to a fixed network or to the other parts of the cellular radio system via transmission lines 126.

The pay phone system further comprises a management system 128 which controls and monitors the operation of the pay phones 100 to 102. In the GSM system used as an example, the control equipment 128 in the pay phone system is connected utilizing, for example, an X.25 interface 130, to a short message service centre 132 which, in turn, is connected to GSM cellular networks and their mobile switching centres. The above description of a cellular radio system thus applies to the GSM system, but it is obvious that although in the other systems the detailed structure deviates from the described one, the structures are similar in relevant parts. It should be noted that also in the GSM system the pay phone system can be implemented without the short message service centre by connecting the control equipment 128 of the pay phone system to the cellular radio system in some other known ways, by a modem, for example.

Let us examine a situation in which a new pay phone 134 is to be installed in the system. In the solution of the invention the pay phone is arranged to detect when a device is switched on for the first time. This can be implemented by a so-called "first use" flag, in other words by setting a predetermined memory location to a particular value. When the device is switched on after the physical installation, the device reads the contents of the memory location and on account of the programming detects that the switch-on is the

first one. In such a case the device does not start its regular activity but sends the management system 128 a message 136 indicating the pay phone in question. The management system starts controlling the pay phone 134 on the basis of the message and sends the necessary operational parameters to the pay phone in a reply message 138. The operational parameters of each pay phone to be installed in the system have already in advance been programmed or set in the management system. Alternatively, the management system sets the operational parameters of the pay phone to be installed in the system on the basis of the location of the pay phone.

The pay phone sends the message 136 as a short message, for example. The pay phone cannot know its phone number at this stage, but the short message service centre 132 attaches the number to the short message. Alternatively, in the GSM system a data call can be made. Connection data on where to and in what manner the first message 136 is to be sent has already in advance been programmed in the pay phone at the factory.

The message sent by the pay phone may comprise information on the location of the pay phone in the network, for example the identifier of the base station. In such a case the location of the pay phone can thus be defined with an accuracy of the base station or the base station antenna sector. A more accurate geographical estimate of the location of the pay phone can also be incorporated into the message by the GPS system, for example.

In a preferred embodiment of the invention the first message of the pay phone does not comprise information on location, but if the information is needed the management system queries the pay phone for the information before setting the operational parameters.

Figure 2 illustrates another preferred embodiment of the invention. The figure shows a pay phone system from the mobile switching centre 124 onwards, the rest of the system being as described in Figure 1. However, the figure shows two management systems 128, 200 of the pay phones, the former 128 being the management system of the operator and the latter 200 the management system of the pay phone manufacturer. In accordance with a preferred embodiment of the invention, the pay phone to be installed sends a message to a predetermined general management system 200, for example the system of the manufacturer. This management system 200 sends the pay phone the information on the connection data about the separate management system 128 of the pay phone. Next, the pay phone sends another mes-

sage on the basis of the connection data received to its management system 128 which starts controlling the pay phone and sends the necessary operational parameters to the pay phone.

Figure 3 illustrates an example of a preferred embodiment of a pay phone of the system in accordance with the invention. The pay phone of the invention comprises a cellular radio transceiver 300, and a control unit 304 which is directly connected to a transceiver 302 without a two-wire connection. The terminal of the invention further comprises a charge collecting means 306 which is connected to the control unit 304. Depending on the implementation, the charge collecting means can accept phone cards, credit cards, smart cards and coins as means of payment. The terminal typically further comprises a selection means 310 by which the desired phone number is selected, a display unit 308 and an earpiece 312. The terminal may further comprise means 314 enabling a "hands free" facility, comprising a speaker 316 and a microphone 318 and the necessary amplifiers. If desired, some or all of the above components can be directly integrated into the transceiver 300, but they can also be implemented as separate means although structurally within the same case.

If necessary, the transceiver unit 300 serves to set up a radio connection to a base station to enable a call to be transmitted. The unit 300 is also responsible for all procedures associated with the radio path and call maintenance commonly assigned to the mobile phone.

The control unit 304 serves to control the pay phone. The control unit typically comprises a micro processor, fixed and reprogrammable memory circuits, multiplexing means and switches. The control unit controls the operation of the other units of the device, registers made calls and is responsible for charging. The operational parameters of the pay phone are usually stored in the control unit memory. These phone-specific parameters include the phone number, the tariff information on the calls to be made, the language options on the display of the phone and the voice volume. The operation of the control unit does not principally deviate from the operation of the control units of the known pay phones excluding the inventive features described here.

In the pay phone of the system in accordance with the invention, the control unit 304 detects when the pay phone is put to use in the system for the first time. This can be implemented in the way already described above by using the "first use" flag. The control unit 304 controls the transceiver unit 300

in such a manner that the unit sends the management system 128 a message indicating the pay phone in question. In the pay phone system of the invention, the management system is arranged to start controlling the pay phone on the basis of the message and send the necessary operational parameters to the pay phone. The transceiver unit 300 sends the message as a short message or as a data call, as described above. For certain parts, the method of the invention is most preferably implemented by software. For the pay phone, this applies particularly to detecting the first use, controlling the message sending, receiving the operational parameters and storing in the pay phone memory.

The invention is described above in closer detail using a pay phone system as an example. It is obvious that the solution of the invention can be implemented in any telephone system implemented by other techniques, in which the terminals have device-specific operational parameters set by the management system, for example systems in which the terminals are payment terminals used in stores. In such a case the operational parameters comprise, for example, information on the languages available at the terminal, the acceptable charge cards, the control information of the cards and optionally the price codes of products. Furthermore, the wireless local loop systems can also utilize the installation solution of the invention, and systems whose terminals are mobile smart card terminals by which money is transferred between a bank and a smart card.

Although the invention is described above with reference to the example in accordance with the accompanying drawings, it is to be understood that the invention is not restricted thereto but it can be modified in many ways within the scope of the inventive idea disclosed in the appended claims.